Timothy Walter Davis PhD
Research Scientist
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Adjunct Research Fellow
Australian Rivers Institute
Griffith University
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Australia

Education:

Bachelor of Science- Marine Science- Concentration: Biology- 2004- Southampton College of Long Island University- **Summa cum Laude**

Doctorate of Philosophy- Marine and Atmospheric Science- Conferred: December 22, 2009- Stony Brook University; Dissertation title: Effects of nutrients, temperature, and zooplankton grazing on toxic and non-toxic strains of the harmful cyanobacterium *Microcystis* spp.

Professional Experience:

NSERC (Natural Sciences and Engineering Research Council of Canada) Research Fellow, December 2013-March 2014 Watershed Hydrology and Ecology Research Division, Environment Canada, Canadian Centre for Inland Waters, Burlington ON L7R 4A6, Salary: $51,900 CAD, Hours worked per week: 40+

Queensland Smart Futures Fellow, **2012** Australian Rivers Institute, Griffith University, Nathan Queensland 4111. Project Title: *New technologies for identifying emerging cyanotoxin producers and their prevalence under a changing climate*, Salary: $79,399 AUD, Hours worked per week: 40+

Team leader- *Cylindrospermopsis raciborskii* genome comparison project, 2010 - Present

- This international collaboration focuses on the sequencing and annotation of eight *C. raciborskii* genomes consisting of toxic and non-toxic strains from tropical, sub-tropical, and temperate Australia and Asia. My team is investigating the differences between these genomes to better understand its ecological niche.

Post-doctoral Research Fellow- Assoc. Prof. Michele Burford- Australian Rivers Institute, Griffith University, Nathan, Queensland 4111, Australia, December 2009 - January 2012, Salary: $70,049 AUD, Hours worked per week: 40+

- Conducted independent research on toxic and non-toxic strains of the harmful cyanobacterium *Cylindrospermopsis raciborskii*
- Developed molecular techniques to identify and quantify genes associated with nutrient uptake and toxin production in *C. raciborskii*

- Developed collaborations with national and international research partners
- Wrote research proposals and apply for internal and external funding
- Mentored post-graduate and undergraduates students as well as managed research assistants

Graduate Research Assistant- Prof. Christopher Gobler- School of Marine and Atmospheric Sciences, Stony Brook University, Stony Brook, NY 11794 USA, January 2004 - December 2009 Salary: $22,000 USD, Hours worked per week: 40+

- Conducted doctoral research on harmful cyanobacterial blooms in various systems using an array of field and laboratory analytical techniques associated including a series of molecular methods
- Presented findings at national and international meetings
- Authored manuscripts published in international, peer-reviewed journals

Publications:

Burford, M.A., **Davis, T.W.**, Orr, P.T., Sinha, R., Willis, A., Neilan, B.A., *in revision.* Nutrient-related changes in the toxicity of field blooms of the cyanobacterium, *Cylindrospermopsis raciborskii*. *FEMS Microbiology Ecology*, February 2014**.**

Sinha, R., Pearson, L.A., **Davis, T.W.**, Muenchhoff, J., Pratama, R., Jex, A., Burford, M.A., Neilan, B.A., 2014 *in press*. Comparative genomics of *Cylindrospermopsis raciborskii* strains with differential toxicities. *BMC* Genomics, DOI: 10.1186/1471-2164-15-83.

Davis, T.W., Orr, P.T., Boyer, G.L., Burford, M.A., 2014. Investigating the production and release of cylindrospermopsin and deoxy-cylindrospermopsin by *Cylindrospermopsis raciborskii* over a natural growth cycle. *Harmful Algae* 31: 18-25

Muhid, P., **Davis, T.W.**, Bunn, S.E., Burford, M.A., 2013. Effects of inorganic nutrients in potable recycled water on freshwater phytoplankton biomass and composition. *Water Research* 47: 384-394.

Davis, T.W., Koch, F., Marcoval, M.A., Wilhelm, S.W., Gobler, C.J., 2012. Mesozooplankton and microzooplankton grazing during cyanobacterial blooms in the western basin of Lake Erie. *Harmful Algae* 15: 26-35.

Sinha, R., Pearson, L.A., **Davis, T.W.**, Burford, M.A., Orr, P.T., Neilan, B.A. 2012. Increased incidence of *Cylindrospermopsis raciborskii* in temperate zones - is climate change responsible? *Water Research* 46: 1408-1419.

O'Neil, J.M., **Davis, T.W.**, Burford, M.A., Gobler, C.J., 2012. The Rise of Harmful Cyanobacteria Blooms (CHABs): Role of Eutrophication and Climate Change in Freshwater, Estuarine and Marine Ecosystems. *Harmful Algae* 14: 313-334.

Burford, M.A., **Davis, T.W.**, 2011. Physical and chemical processes promoting dominance of the toxic cyanobacterium *Cylindrospermopsis raciborskii*. *Chinese Journal of Oceanology and Limnology* 29: 883-891.

Davis, T.W., Gobler, C.J., 2011. Grazing by mesozoplankton and microzooplankton on toxic and non-toxic strains of *Microcystis* in the Transquaking River, a tributary of Chesapeake Bay. *Journal of Plankton Research* 33: 415-430.

Davis, T.W., Harke, M.J., Marcoval, M.A., Goleski, J., Orano-Dawson, C., Berry, D.L., Gobler, C.J., 2010. Effects of nitrogenous compounds and phosphorus on the growth of toxic and non-toxic strains of *Microcystis* during cyanobacterial blooms. *Aquatic Microbial Ecology* 61: 149-162.

Davis, T.W., Berry, D.L., Boyer, G.L., Gobler, C.J., 2009. The effects of temperature and nutrients on the growth and dynamics of toxic and non-toxic strains of *Microcystis* during cyanobacteria blooms. *Harmful Algae* 8: 715-725.

Gobler, C.J., **Davis, T.W.**, Deonarine, S.N., Saxton, M., Jochem, F., Wilhelm, S.W. 2008 Grazing and virus-induced mortality of microbial populations before and during the onset of hypoxia in Lake Erie. *Aquatic Microbial Ecology* 51: 117-128.

Gobler, C.J., **Davis, T.W.**, Coyne K.J., Boyer, G.L. 2007. Interactive influences of nutrient loading, zooplankton grazing, and microcystin synthetase gene expression on cyanobacterial bloom dynamics in a eutrophic New York lake. *Harmful Algae* 6: 119-133.

Gobler, C. J., Thibault, D.B., **Davis, T.W.**, Curran, P.B., Peterson, B.J., Liddle, L.B. 2006. Algal assemblages associated with *Stegastes* sp. territories on Indo-Pacific coral reefs: Characterization of diversity and controls on growth. *Journal of Experimental Marine Biology and Ecology* 336: 135-145.

Unpublished reports:

Davis, T.W., Watson, S.B., 2013. Advancing cHAB monitoring efforts in Hamilton Harbour: Incorporating molecular methods to detect potential toxin producers. Hamilton Harbour Watershed Monitoring and Research Report, 8pp.

Funding:

Pending

1. 2014, Project Title: *Integrated field and laboratory investigation of links between nutrients, dissolved organic carbon, reactive oxygen species, and toxicity of harmful algal blooms*, Principal Investigator: Dr. Gregory Dick, University of Michigan, Budget: **$25,000**, Funded by: CILER Great Lakes Long-term Fellowship Program, **Role: Co-PI**
2. 2014-2016, Project Title: *Assessing potentially toxic cyanobacterial blooms in South-eastern Georgian Bay trough combined limnological and advanced genomic techniques*, Principal Investigator: Dr. Natalia Ivanova, Biodiversity Institute of Ontario-University of Guelph, Budget: **$383,190**, Funded by: Lake Simcoe/ South-eastern Georgian Bay Clean-Up Fund, **Role: Co-PI**.
3. 2014, Project Title: *Investigating the environmental drivers of harmful cyanobacterial blooms in Lake St. Clair*, Principal Investigator: Prof. Jan Ciborowski, University of Windsor, Budget: **$35,375**, Funded by: Science Horizons, **Role: Co-PI**.

Current

1. 2014-2015, Project Title: *Building capacity for freshwater science: Integrating microbial genomics, environmental chemistry, and ecosystem processes to understand harmful algal blooms*, Principal Investigator: Assist. Prof. Gregory Dick - University of Michigan, Budget: **$249,485**, Funded by: University of Michigan Water Center, **Role: Team member**.
2. 2012-2014, Project Title: *Development of novel toxin detection methodologies applicable to marine and freshwater systems*, Principal Investigator: Assoc. Prof. Judy Westrick, Wayne State University, Budget: **$133,797**. Funded by: National Institute of Environmental Health Sciences (NIH), **Role: Co-PI**.
3. 2012-2014, Project Title: *Development of novel toxin detection methodologies applicable to marine and freshwater systems*, Principal Investigator: Assoc. Prof. Judy Westrick,

Wayne State University, Budget: **$272,054**. Funded by: National Science Foundation, **Role: Co-PI**.

4. 2013-2014, Project Title: *Microcystis blooms and associated bird mortalities studies and investigation of Microcystis management options for the Paul S. Sarbanes Ecosystem Restoration Project at Poplar Island*, Principal Investigator: Dr. Kevin Sellner, Chesapeake Research Consortium, Molecular-specific budget: **$18,500**, Funded by: Maryland Environmental Service, **Role: Co-PI**.
5. 2013-2014, Project Title: *Coordinated Onboard Education & Outreach*, Principal Investigator: Dr. Janet Vail, Grand Valley State University, Budget**: $250,000**, Funded by: Great Lakes Restoration Initiative, **Role: Contributing author**.

Previous

1. 2012, Project Title: *Transcriptomics: A new tool for understanding the ecology of toxic cyanobacteria*, Principal Investigator: **Dr. Timothy Davis**, Budget: **$8,000**, Funded by: Griffith University
2. 2012-2015, Project Title: *New technologies for identifying emerging cyanotoxin producers and their prevalence under a changing climate*, Principal Investigator: **Dr. Timothy Davis**, Budget: **$450,000**, Funded by: Queensland Government
3. 2011-2012, Project Title*: Investigating the use of qPCR as an early warning system for toxic cyanobacteria blooms*, Principal Investigator: Assoc. Prof. Judy Westrick, Lake Superior State University, Budget: **$30,000**, Funded by: US EPA, **Role: Supporting scientist**.

Teaching Experience:

Inland Seas Education Association
Education Director, April 2012 – November 2012

- Develop age-appropriate science curriculums for students ranging from elementary school through undergraduate level
- Lead and oversee on-board educational programs
- Develop and write proposals to local, state, and federal funding agencies
- Oversee interns
- Present scientific and educational presentations

Griffith University
Co-instructor-Ecological theory and practice -2051ENV- Dr. Guillermo Diaz-Pulido, Assoc. Prof. Fran Sheldon, Prof. Jane Hughes, Dr. Timothy Davis, Griffith University, Semester 2, 2011

- Prepared and presented a series of lectures on primary production and energy flow through ecosystems

Co-instructor-Science of water-Integrated Water Management masters program-International Water Centre, Brisbane 2011

- Prepared lectures and activities for post-graduate students
- Coordinated teaching and other activities with international collaborators

Stony Brook University

Co-instructor-Environmental problems and solutions-MAR 340-Dr. Kurt Bretsch and Timothy Davis-Spring 2009

- Prepared a syllabus and coordinate lecture schedule
- Compose lectures
- Create tests and homework assignments

Guest lecturer- Women in Science and Engineering (WISE)- Tara Duffy& Kestrel Perez-Stony Brook University, Fall 2008

Guest lecturer-Long Island Marine Habitats-MAR 303-Lyndie Hice & Tara Duffy- SoMAS, Stony Brook University, Fall 2008

Guest lecturer-Phytoplankton Ecology- MAR 515 -Dr. Chris Gobler-SoMAS, Stony Brook University, Fall 2006, Fall 2008

Guest lecturer-Plankton Ecology- MAR 366 -Dr. Chris Gobler-SoMAS, Stony Brook University, Fall 2006, Fall 2008

Teaching practicum-Biological Oceanography-MAR 347-Dr Christopher J. Gobler-SoMAS, Stony Brook University, Spring 2007

- Gained experience in preparing for and giving lectures
- Coordinated and prepared the laboratory section of the course
- Graded exams and lab write-ups
- Gained experience interacting with students

Teaching assistant- Experimental Marine Biology-MAR-S 305-Dr. Brad Peterson- SoMAS, Stony Brook University, Fall 2005

- Coordinated with Dr. Peterson to design class labs
- Taught the laboratory techniques section of the class
- Assisting in field collection, analysis, and experimental set-up
- Gaining teaching experience

Student mentorship:

Mr. Craig Irwin-2013-2014- Co-op student with Environment Canada
Mrs. Jenisse German, 2013, Co-op student with Environment Canada
Mr. Jack Calder-2013- Co-op student with Environment Canada
Mrs. Maisa Fumagalli-2013- Co-op student with Environment Canada
Ms. Rati Sinha- PhD student at the University of New South Wales, anticipated date of graduation: 2014
Mr. Sebastian Knight- Griffith University summer scholarship student-2011
Mr. Matthew Harke-Summer research assistant- 2007
Mr. Justin Fischdicke- Summer research assistant- 2006

Service:

- Australian Rivers Institute Health, Safety, Equipment, and Space committee -2011
- Reviewer for the journals *Harmful Algae*, *Hydrobiologia*, *Limnology and Oceanography*, *European Journal of Phycology*, *Applied and Environmental Microbiology*, *Aquatic Microbial Ecology*, *Phycologia* and *Fundamental and Applied Limnology*, *Journal of Great lakes Research*

Outreach and Partnerships

- Maryland DEC Harmful Algal Bloom Taskforce, Maryland, USA
- Southampton Town Trustees, Southampton, NY, USA
- Lake Agawam Conservation Association, Southampton, NY, USA

Affiliations:

- International Society for the Study of Harmful Algae
- Association for the Sciences of Limnology and Oceanography
- Global Lake Ecological Observatory Network (GLEON)

Presentations:

Invited

Davis T.W. 2013. Why are our lakes the same color as our lawns? Investigating the ecology of toxic cyanobacterial blooms using molecular techniques. Great Lakes Environmental Research Laboratory, November 2013, Host: Dr. Henry Vanderploeg

Davis, T.W., Watson, S.B. 2013. Advancing cyanobacterial bloom monitoring in Hamilton Harbor: Incorporating molecular methods to detect potential toxin producers. Hamilton harbor Research and Monitoring workshop – XIII. Canada Centre for Inland Waters, March 2013

Davis T.W., Gobler, C.J., Sinha, R., Neilan, B.A. 2012. PCR applications for toxin monitoring. 2012 Water Quality Technology Conference & Exposition Toronto, Workshop: Analysis of Algae in Water Supplies: Applications of Alternative Methods Ontario, Canada, November 2012

Davis T.W. 2011. Why are our lakes the same color as our lawns? Investigating the ecology of toxic cyanobacterial blooms using genetic techniques. University of Amsterdam, July 2011, Host: Dr. Petra Visser

Davis, T.W., Koch, F., Marcoval, A., Wilhelm, S.W., Gobler, C.J., 2011. Cyanobacterial blooms in the Laurentian (North American) Great Lakes: does a top-down control exist? Australian Rivers Institute Research Fellow Symposium, Griffith University – Nathan Campus, Nathan, QLD, Australia, February 2011, Host: Dr. Wade Hadwen

Davis, T.W. 2010. Why are our lakes the same color as our lawns? Resolving the ecology of toxic cyanobacteria blooms using genetic techniques. Annis Water Resources Institute, Grand Valley State University, Muskegon, MI, USA, November 2010, Host: Dr. Ryan Thum

Davis, T.W. 2010. Why are our lakes the same color as our lawns? Resolving the ecology of toxic cyanobacteria blooms using genetic techniques. Lake Superior State University, Sault Ste Marie, MI, USA, November 2010, Host: Dr. Judy Westrick

Davis, T.W, 2010. Effects of nutrients, temperature, and zooplankton grazing on toxic and non-toxic strains of the harmful cyanobacterium *Microcystis* spp. Australian Rivers Institute Seminar series, Griffith University – Nathan Campus, Nathan, QLD, Australia, March 2010, Host: Dr. Catherine Leigh

Davis, T.W., Orano-Dawson, C., Harke, M., Gobler, C. J., 2009. What's driving toxic *Microcystis* blooms? A molecular approach to an ecological problem. Biology Graduate Seminar Long Island University-C.W. Post Campus, Brookville, NY, September 2009, Host: Dr. Matthew Draud

Davis, T.W., Orano-Dawson, C., Harke, M., Gobler, C. J., 2009. The effects of global warming, eutrophication, and grazing on toxic *Microcystis* blooms in Chesapeake Bay

tributaries: a focus on Transquaking River. University of Maryland Center for Environmental Science- Horn Point Laboratory, April 2009, Host: Dr. Diane Stoecker

Davis, T.W., Orano-Dawson, C., Harke, M., Gobler, C.J., 2008. The effects of global warming, eutrophication, and grazing on toxic *Microcystis* blooms in Chesapeake Bay tributaries: a focus on Transquaking River. Maryland DEC HAB Taskforce Meeting, Annapolis, MD, Host: Ms. Catherine Wazniak

Davis, T.W., Harke, M., Gobler, C.J., 2007. Solutions for toxic blue green algae on Long Island: A comparison of two approaches. Stony Brook-Southampton's Coastal and Esturaine Research Program Symposium, Stony Brook-Southampton, Southampton, NY, USA, Host: Dr. Christopher Gobler

Davis, T.W., Gobler, C.J., 2007. Toxic blue green algae on Long Island: Problems with, and potential solutions for, freshwater cyanobacteria blooms. Stony Brook-Southampton's Coastal and Estuarine Research Program Symposium, Stony Brook-Southampton, Southampton, NY, USA, Host: Dr. Christopher Gobler

Contributed

Davis, T.W., Orr, P.T. Boyer, G.L., Burford, M.A., 2013. Investigating the production and release of cylindrospermopsin and deoxy-cylindrospermopsin by *Cylindrospermopsis raciborskii* over a natural growth cycle. 9th International Conference on Toxic Cyanobacteria, Pilanesberg National Park, South Africa

Davis, T.W., Gobler, C.J., 2011. Differential ecology of toxic and non-toxic strains of *Microcystis* during blooms events. ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico

Davis, T.W., Gobler, C.J., 2010. What's Driving Toxic *Microcystis* Blooms? A molecular approach to an ecological problem. 8th International Conference on Toxic Cyanobacteria, Istanbul, Turkey

Davis, T.W., Gobler, C.J., 2009. Meso- and microzooplankton grazing on toxic and non-toxic strains of the harmful cyanobacterium *Microcystis* spp. 2009 US Harmful Algal Bloom Conference, Ocean Shores, WA, USA

Davis, T.W., Gobler, C.J., 2008. The effects of temperature and eutrophication on toxic and non-toxic strains of *Microcystis* within New York lakes. 2008 US Harmful Algal Bloom Conference, Marine Biological Laboratory, Woods Hole, MA, USA

Gobler, C.J., **Davis, T.W.**, Coyne K.J., Boyer, G.L., 2005. Distribution and ecology of toxic and non-toxic strains of *Microcystis* populations in North American lakes. The Twelfth International Conference on Harmful Algae, Copenhagen, Denmark.

Gobler, C.J., **Davis, T.W.**, Coyne K.J., Boyer, G.L., 2005. The impact of nutrient loading and zooplankton grazing on the growth of, and toxin synthesis by, cyanobacteria blooms in Lake Agawam, NY, USA. 2005 US Harmful Algal Bloom Conference, Monterey, CA, USA

Gobler, C.J., **Davis, T.W.**, Coyne K.J., Boyer, G.L., 2005. The contrasting impacts of nutrient loading and zooplankton grazing on the growth and toxicity of cyanobacteria blooms in a eutrophic New York lake. International Symposium on Cyanobacterial Harmful Algal Blooms, Research Triangle Park, NC, USA

Gobler, C.J., **Davis, T.W.**, Coyne K.J., Boyer, G.L. 2005., Impact of nutrient loading and zooplankton grazing on abundance, growth and toxin production of freshwater cyanobacteria, ALSO 2005, Salt Lake City, UT, USA

Davis, T.W., Gobler, C.J., Boyer, G.L., 2004. The first report of toxic cyanobacteria blooms on Long Island, NY, USA. The Eleventh International Conference on Harmful Algae, Cape Town, South Africa

Cruise Experience:

Environment Canada lake Erie and Lake Ontario HAB Cruises, *CCGV Limnos*, **I conducted multiple nutrient amendment experiments to investigate the molecular response of potentially toxic cyanobacteria to changes in their chemical environment. May 2013-present.**

International Field Years on Lake Erie (IFYLE), *Lake Guardian*, Lake Erie. I conducted meso and microzooplankton grazing experiments to evaluate microbial mortality before, during, and after the onset of hypoxia in Lake Erie. July 2005.

Microbial Ecology of the Lake Erie Ecosystem X (MELEE X), *CCGV Limnos*, I conducted grazing experiments temperature manipulation, and nutrient amendment experiments gain a better understand how these environmental factors could potentially impact the harmful cyanobacteria blooms in Lake Erie's western basin. August 2005

Microbial Ecology of the Lake Erie Ecosystem XI (MELEE XI), *CCGV Limnos*, I conducted grazing experiments temperature manipulation, and nutrient amendment experiments to try and better understand how these environmental factors could potentially impact the harmful cyanobacteria blooms in Lake Erie's western basin. August 2006

US EPA Lake Erie Cruise, *Lake Guardian*, I conducted further grazing experiments but collected flow-cytometry and HPLC samples to try to better understand how different groups of phytoplankton are affected by micro and mesozooplankton during cyanobacterial blooms in the western basin. September 2007.

References:

Dr. Christopher Gobler
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Dr. Gregory Boyer
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